REMARKS

Claims 1 through 40 continue to be in the case.

New claims 41 through 53 are being introduced.

New claim 41 are based on features of the invention believed to be distinguishing over the reference Kaga et al.

New claims 49 through 51 are based on the language of claim 21.

New claims 52 and 53 recite language defining the shape of the generated aqueous jet.

The Office Action mailed on March 11, 2004 refers to Claim Rejections - 35 USC § 103.

2. Claims 1-14, 20 stand rejected under 35 U.S.C. 103(x) as being unpatentable over Kaga et al. (U.S. Patent No. 5,609,781).

Kaga et al. teach a device comprising a pressure flow generator (see Fig. 38-42), an automatic control unit (20), a supply capillary connected to a high frequency current supply device e.g. gas (see Fig. 38-42) and a separating nozzle having a circular cross section (2).

Applicant respectfully disagrees.

The reference Kaga et al. is directed to a laser machining head for laser cutting and laser machining apparatus for controlling the laser machining head (reference Kaga et al., column 1, lines 10 to 12).

The present invention is directed to a water-jet device for separating a biological structure.

As the reference Kaga et al. is directed to laser cutting, there is no direction within the four corners of the reference Kaga et al. to do anything else but laser cutting and in particular no direction to a water-jet device to separate biological structures, there is nothing obvious relating to a water-jet device in the teaching of Kaga et al. relating to a laser machining head.

The reference Kaga et al. teaches a main assist gas nozzle 1 (column 8, line 26) and a sub assist gas nozzle 2 (column 8, lines 8 and 9). The Office Action identifies the nozzle (2) of the Kaga et al. reference with the separating nozzle (14) of applicant's claim 1. However, claim 1 of the applicant associates spiral grooves (16) with the separating nozzle (14), the reference Kaga et al. does not associate any static wings with the sub assist gas nozzle (2).

Furthermore, the present invention is directed to a water-jet device for separating a biological structure. The corresponding German patent

application and the corresponding European patent application were classified in international class A61B 17/32 by the German and, respectively, European patent offices. International class A61B 17/32 relates to surgical instruments of human medicine and of veterinary medicine. It is prohibited in this field to employ gas laser apparatus such as taught in the reference Kaga et al.

The subject matter of the present invention and of the reference Kaga et al. are in principle different based on the different media employed: water and gas. There is no obviousness relating to such different processing media. This situation may be clear to anybody who has seen a gas station: The air hose and the gasoline hose are completely separate and have nothing in common.

Furthermore, a person of ordinary skill in the art constructing a water-jet device of medical technology in international class A61B 17/32 would not try to gather suggestions from the international class 23K 26/14 relating exclusively to laser cutting devices for metal processing, and to which class the reference Kaga et al. belongs.

If a person of ordinary skill in the art in surgical instruments in human medicine and veterinary medicine would encounter the reference Kaga et al.,

such person would not be able to make good use of it for the following six reasons.

1. The reference Kaga et al. teaches laser cutting under oxidative conditions and this is a no-no in surgical technology.
2. The reference Kaga et al. does not employ water in cutting operations, but instead employs a gas mixture, which is prohibited in medical technology.
3. The reference Kaga et al. teaches not a single nozzle channel 15, but instead both a main assist gas nozzle 1 (column 8, line 26) and a sub assist gas nozzle 2 (column 8, lines 8 and 9) having two separate nozzle exit openings (compare for example reference Kaga et al., Fig. 30).
4. The reference Kaga et al. does not have a cylindrical section of a single nozzle channel 15, but teaches both a main assist gas nozzle 1 (column 8, line 26) and a sub assist gas nozzle 2 (column 8, lines 8 and 9), where both nozzles run out conically at their distal ends (for example compare Fig. 10A of the reference Kaga et al.)
5. The reference Kaga et al. does not teach a single nozzle channel 15 with at least one spiral groove 16, but two nozzles 1 and 2, wherein

the Office Action identifies the nozzle 2 of Kaga et al. with applicant's nozzle channel 15, wherein only the nozzle 1 of Kaga et al. is furnished with spiral grooves 5. In contrast, the nozzle 2 of Kaga et al. is not associated with any elements, which would generate a rotary gas motion.

6. While the spiral grooves of the applicant generate a water jet beam rotating around the axis of the water jet beam, the reference Kaga et al does not furnish any rotary motion to the outer gas stream of the outer nozzle 2. Only the inner gas stream of the inner nozzle 1 of the reference Kaga et al. is rotated, however with the limited goal of better mixing the inner gas stream and the outer gas stream. The resulting gas stream from mixing the inner gas stream with the outer gas stream does not exhibit any rotary motion when exiting the exit nozzle 2a.

The Office Action continues that the nozzle is disposed fixedly positioned and coaxial with the supply capillary (see Fig. 38-42); further, the nozzle includes at least one twisted groove, wherein the number of twisted

grooves and the diameter and the length of he nozzle channel are placed in such a ratio to each other that the separating jet subjected to pressure is rotated (see Fig. 10B, 10C, 11A and 11 B).

Applicant respectfully disagrees.

The present applicant presents a nozzle for water, which is essentially an incompressible medium, which nozzle has a cylindrical output channel for generating a stable jet beam of water. In clear contrast, the reference Kaga et al. teaches in Fig. 10B, 10C, 11A and 11 B two conical output channels, apparently to increase the gas speed at the exit point of the gas. Such nozzle of the reference Kaga et al. would be clearly contrary to the purpose of the present application to produce a stable water-jet.

The Office Action continues that Kaga et al. have all the features of the invention but Kaga et al. failed to teach a water jet device and the slope of the spiral flutes is dimensioned larger than the diameter of the nozzle channel and wherein the spiral flutes exhibit a slope angle of from about 30 to 45 degrees. It would have been obvious to one having ordinary skills in the art at the time the invention was made to substitute gas jet for water jet for dispensing. Furthermore, it would have been obvious to one skilled

artisan in the art to have the slope of the spiral flutes is dimensioned larger than the diameter of the nozzle channel and wherein the spiral flutes exhibit a slope angle of from about 30 to 45 degrees to achieve a better flow and the jet is subjected to a rotating pressure.

Applicant respectfully disagrees.

The reference Kaga et al. fails to teach the basic requirements of a water-jet device. Since Kaga et al. fails to cover the basics of a water-jet device, no person of ordinary skill in the art would look to the reference Kaga et al. for inspiration relative to the construction of a water-jet device and the considerations of the Office Action relative to obviousness of applicant's claims are clearly based on hindsight in view of the present invention.

The Office Action asserts above that "It would have been obvious to one having ordinary skills in the art at the time the invention was made. to substitute gas jet for water jet for dispensing."

Neither the nozzles of Kaga et al. nor the nozzle of the present invention are for dispensing. The nozzles of Kaga et al. deliver assist gas for assisting in laser cutting. The nozzle of the present invention delivers a water-jet for separating biological structures. The nozzles employed in the

two situations are clearly different: Kaga et al teaches a conically converging end section of the nozzles for increasing gas speed and the present application discloses an inner cylindrical end section for generating a round water-jet.

There is no suggestion in the Office Action to employ a conical end section of the reference Kaga et al. to any nozzle of the present application even though the reference Kaga et al. teaches redundantly to employ such a conical end section of the nozzles. Applicants invention would be clearly inoperable with the nozzles 1, 2 of the reference Kaga et al. used as a substitute. It appears to be overbearing, when the Office Action alleges obviousness of applicant's claims in view of Kaga et al., where the prominent feature of nozzles with conical end sections of Kaga et al. by substitution in applicant's invention would lead to a non-operable water-jet device.

The Office Action continues that Kaga et al. have all the features of the invention but Kaga et al. do not mention specifically the hollow cylinder of the nozzle has a length of an inner cylinder which is from about 1 to 5 times the diameter of the inner cylinder, the width of the spiral grooves in 0.08-0.2 times the diameter of the inner cylinder of the nozzle and the depth

of the spiral grooves is 0.2-0.4 times the width of the spiral grooves. It would have been obvious matter of design choice to have the hollow cylinder of the nozzle has a length of an inner cylinder which is from about 1 to 5 times the diameter of the inner cylinder, the width of the spiral grooves in 0.08-0.2 times the diameter of the inner cylinder of the nozzle and the depth of the spiral grooves is 0.2-0.4 times the width of the spiral grooves to have the appropriate ratio between the length of the nozzle and the grooves so that when the jet exiting the nozzle, it swirled.

Applicant respectfully traverses.

The only question of design choice would be the construction of a laser machining head, but there is no design choice in view of Kaga et al. in the production of a water jet device.

Where the reference Kaga et al fails completely to teach an inner cylindrical shape of the end section of the applicant's separating nozzle, it appears to be preposterous to allege that the details claimed by the applicant regarding this inner cylindrical shape are obvious over the reference Kaga et al., where the reference Kaga et al. nowhere contemplates an end section of the nozzles having even an inner cylindrical shape,

The Office Action refers to Response to Arguments.

5. Applicant's arguments filed February 06, 2004 have been fully considered but they are not persuasive. The claims have been addressed in the above paragraphs.

The Examiner does not recognize "the gas mixture performs any cutting operation" cited in the claims. The claimed invention teaches an apparatus having a nozzle with grooves so that when the gas exiting the nozzle, it rotates. Kaga et al. teaches an apparatus that performs the same function.

Applicant respectfully submits that Kaga et al. clearly teach laser cutting and not gas cutting. The reference Kaga et al. in column 1, lines 24 to 28 states: "Especially, in case of cutting steel and so on, the metal which is melted by direct laser beam heating is not only blown off by an oxygen jet flow used as an assist gas, but is also sublimated or melted with a strong oxidizing burning reaction, which improves cutting efficiency." Since the water-jet of the present application clearly avoids "a strong oxidized burning reaction", the reference Kaga et al. does not perform the same function in contrast to such allegation in the Office Action.

As to the allegation of the Office action that the reference Kaga et al. teaches that "the gas exiting the nozzle, it rotates", let the reference speak for itself in Kaga et al., column 8, lines 18 through 23 as follows: "In the third embodiment, a plurality of static wings twisted in a screw shape are mounted on the inner surface of the main assist nozzle 1 for causing twisting flows which increases the pressure and flow velocity fluctuation of the main assist gas flow.". Thus the reference Kaga et al. says the static wings are for inducing velocity fluctuations in another gas flow. In summary, the reference Kaga et al. completely fails to teach anything whatsoever about a production of a rotary water-jet device.

Reconsideration of all outstanding rejections is respectfully requested.

All claims as presently submitted are deemed to be in form for allowance and an early notice of allowance is earnestly solicited.

Respectfully submitted,

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